THE DISCREPANCY BETWEEN TANGENTIAL AND AXIAL MAPS IN DETERMINING THE TREATMENT ZONE SIZE FOR MYOPIA CONTROL WITH ORTHOKERATOLOGY LENSES Kaitlyn Arnold, BS, Jeffrey Reardon, BA, Chad Rosen, OD, MBA, FAAO

Introduction

- A dramatic increase of myopia in the world's population & a larger increase in severe myopia presents a health care problem
- Currently, there is no industry standard on how to measure the treatment zone size in myopic orthokeratology treatment
- Corneal topography plays a key role in fitting ortho-k lenses; Axial and tangential maps play different roles in this process
- Lack of consistency in naming/defining the "treatment zone" impacts the potential amount of myopia control occurring with ortho-k lenses
- This study addresses the differences in corneal topographical measurements in ortho-k patients with a goal to determine a standard method of assessment for "treatment zone" size

Methods

- Retrospective design from University Eye Center database files and Medmont E300 corneal topographer
- 50 eyes of 25 patients who underwent successful ortho-k treatment using Paragon CRT lenses
- Various indicators between the axial and tangential maps were measured, including: most plus power, power at the pupil margin, & power 1mm in from the pupil margin with all measurements taken in the superior, inferior, nasal and temporal quadrants
- The data was compared between the right and left eyes as well as between mild and moderate refractive myopia groups (25 eyes per group)
- Mild myopia: SE refraction of -0.50D to -3.00D
- Moderate myopia: SE refraction -3.25 to -5.125D
- Images 1 & 2 depict the measurement process via corneal topography. Specifically, at the nasal pupil margin (noted by star in image) with the axial and tangential maps for both OD and OS



OD

Image 2a: Axial map OS with measurement point (star) at nasal edge of pupil

- pupil

Axial



Image 1a: Axial map OD with measurement point (star) at nasal edge of pupil





Tangential

Image 1b: Tangential map OD with measurement point (star) at nasal edge of pupil



Image 2b: Tangential map OS with measurement point (star) at nasal edge of pupil

Results

The Wilcoxon Signed Rank Test revealed there was a statistically significant difference between the axial and tangential most plus power, power at the pupil margin, and power 1mm in from the pupil margin, in all quadrants for the aforementioned comparisons. The tangential power was much higher than axial in all of these comparisons.

The Wilcoxon Signed Rank Test revealed that there was not a statistically significant difference between the axial and tangential power at the center of the

The Mann-Whitney U Test revealed there were no statistically significant differences for any data point between the right and left eye or between refractive groups for pupil size, pupil area, power at the pupil edge, and 1mm from the pupil edge in all quadrants.

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Conclusions

- The significant differences between the axial and tangential maps away from the pupil center can be attributed to generation of each map with the corneal topography software
- The lack of a statistically significant difference between right and left eyes is not surprising, as ortho-k treatment is expected to be similar between right and left eyes
- The lack of statistical difference between mild and moderate refractive groups may indicate that a patient does not need a certain prescription to obtain myopia control benefits with orthokeratology
- This study opens the door of establishing which topographical map is best for evaluating myopic ortho-k treatment in order to better understand the slowing of myopic progression

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